

CHAPTER 43
WATER SUPPLIES — DESIGN AND OPERATION

[Prior to 12/12/90, portions of this chapter appeared in 567—Ch 41]

567—43.1(455B) General information.

43.1(1) *Emergency actions regarding water supplies.* When, in the opinion of the director, an actual or imminent hazard exists, the supplier of water shall comply with the directives or orders of the director necessary to eliminate or minimize that hazard.

43.1(2) *Prohibition on the use of lead pipes, solder and flux.* Any pipe, solder or flux which is used in the installation or repair of any public water supply system or any plumbing in a residential or non-residential facility providing water for human consumption which is connected to a public water supply system shall be lead-free as defined in 567—40.2(455B). This action shall not apply to leaded joints necessary for the repair of cast iron pipe.

43.1(3) *Use of noncentralized treatment devices.*

a. Public water systems shall not use bottled water, point-of-use (POU) or point-of-entry (POE) devices to achieve permanent compliance with a maximum contaminant level, action level, or treatment technique requirement in 567—Chapters 41 and 43.

b. The department may require a public water system exceeding a maximum contaminant level, action level, or treatment technique requirement specified in 567—Chapters 41 and 43 to use bottled water as a condition of an interim compliance schedule or as a temporary measure to avoid an unreasonable risk to health. The system must meet the following requirements:

(1) Submit for approval to the department a monitoring program for bottled water. The monitoring program must provide reasonable assurances that the bottled water complies with all the maximum contaminant levels, action levels, or treatment technique requirements in 567—Chapters 41 and 43. The public water system must monitor a representative sample of bottled water for all contaminants regulated under 567—Chapters 41 and 43 the first quarter that it supplies the bottled water to the public, and annually thereafter. Results of the monitoring program shall be provided to the department annually.

(2) The public water system must receive a certification from the bottled water company that the bottled water supplied has been taken from an “approved source”; the bottled water company has conducted monitoring in accordance with 43.1(3) “*b*”(1); and the bottled water meets MCLs, action levels, or treatment technique requirements as set out in 567—Chapters 41 and 43. The public water system shall provide the certification to the department the first quarter after it supplies bottled water and annually thereafter.

(3) The public water supply system is fully responsible for the provision of sufficient quantities of bottled water to every person supplied by the public water system via door-to-door bottled water delivery.

c. Point-of-use devices. Reserved.

d. Point-of-entry devices. Reserved.

43.1(4) *Cross-connection control.* To prevent backflow or backsiphonage of contaminants into a public water supply, connection shall not be permitted between a public water supply and any other system which does not meet the monitoring or drinking water standards required by this chapter except as provided below in “*a*” or “*b*.”

a. Piping systems or plumbing equipment carrying nonpotable water, contaminated water, stagnant water, liquids, mixtures or waste mixtures shall not be connected to a public water supply unless properly equipped with an antisiphon device or backflow preventer approved by the department.

b. Positive separation shall be provided through the use of an air gap separation or an approved backflow preventer at all loading stations for bulk transport tanks.

(1) The minimum required air gap shall be twice the diameter of the discharge pipe.

(2) An approved backflow preventer for this application shall be a reduced pressure backflow preventer or an antisiphon device which complies with the standards of the American Water Works Association and has been approved by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California.

When, in the opinion of the department, evidence clearly indicates the source of contamination within the system is the result of a cross-connection, the department may require a public water supply to identify and eliminate the connection.

567—43.2(455B) Permit to operate.

43.2(1) Except as provided in 43.2(2) and 43.2(3), no person shall operate any public water supply system or part thereof without, or contrary to any condition of, an operation permit issued by the director.

43.2(2) The owner of any public water supply system or part thereof must make application for an operation permit. No such system shall be operated without an operation permit, unless proper application has been made. The time requirement for having a valid operation permit is automatically extended until the application has either been approved or disapproved by the director.

43.2(3) Application and issuance.

a. Application for operation permits shall be made on forms provided by the department and shall be accompanied by the fee specified in 43.2(3)“*b.*” The application for an operation permit shall be filed at least 90 days prior to the date operation is scheduled to begin unless a shorter time is approved by the director. The director shall issue or deny operation permits for facilities within 60 days of receipt of a completed application, unless a longer period is required and the applicant is so notified. The director may require the submission of additional information deemed necessary to evaluate the application. If the application is incomplete or otherwise deficient, processing of the application shall not be completed until such time as the applicant has supplied the missing information or otherwise corrected the deficiency.

b. Operation fees.

(1) A nonrefundable fee for the operation of a public water supply system shall be paid annually. The fee shall be based on the population served. The fee shall be the greater of \$25 per year or \$0.14 multiplied by the total population served by the public water supply for all community and nontransient noncommunity public water supply systems. The fee shall be \$25 per year for all transient noncommunity water systems. Where a system provides water to another public water supply system (consecutive public water supply system) which is required to have an operation permit, the population of the recipient water supply shall not be counted as a part of the water system providing the water.

(2) Fee notices. The department will send annual notices to public water supply systems at least 60 days prior to the date that the operation fee is due.

(3) First annual fee payment. The annual fee payment for the fiscal year beginning July 1, 1995, and ending June 30, 1996, must be paid to the department by December 25, 1995.

(4) Fee payments after July 1, 1996. For the state fiscal year beginning July 1, 1996, and thereafter, the annual operation fee must be paid to the department by September 1 each year.

(5) New public water systems. The initial operation fee payment for a new public water supply is due with the initial application for the annual operation permit. The amount of the initial yearly payment of the operation fee shall be determined based upon the population served. The operation fee will not be prorated. Annual operation fee payments after obtaining an initial operation permit shall be due by September 1 each year, in accordance with the fee schedule outlined in 43.2(3)“*b*”(1).

(6) Fee schedule adjustment. The environmental protection commission may adjust the per capita fee payment by up to +/- \$0.02 per person served so as to achieve the targeted revenue. The environmental protection commission will hold a public hearing concerning the necessity for making a fee schedule adjustment upward or downward for a particular state fiscal year. The extent of the fee adjustment is limited by the intent of 1994 Iowa Acts, Senate File 2314, section 48, and 1995 Iowa Acts, House File 553, section 39. The fee payments will produce revenue amounts of \$350,000 during each fiscal year.

(7) Exempted public water supply systems. Public water supply systems located on Indian lands are exempt from the fee requirements.

c. Late fees. When the owner of a public water supply fails to make timely application or payment of fees, the department will notify the system by a single notice of violation. The department may thereafter issue an administrative order pursuant to Iowa Code section 455B.175(1) or request a referral to the attorney general under Iowa Code section 455B.175(3) as necessary.

d. Identity of signatories of operation permit applications. The person who signs the application for an operation permit shall be:

(1) Corporation. In the case of a corporation, a principal executive officer of at least the level of vice president. The corporation has the option of appointing a designated signatory to satisfy this requirement.

(2) Partnership. In the case of a partnership, a general partner.

(3) Sole proprietorship. In the case of a sole proprietorship, the proprietor.

(4) Public facility. In the case of a municipal, state or other public facility, by either the principal executive officer or the ranking elected official.

e. Appeal. The denial of a permit, or any permit condition, may be appealed by the applicant to the commission pursuant to 567—Chapter 7.

43.2(4) Permit conditions.

a. Operation permits may contain such conditions as are deemed necessary by the director to ensure compliance with all applicable rules of the department, to ensure that the public water supply system is properly operated and maintained, to ensure that potential hazards to the water consumer are eliminated promptly, and to ensure that the requirements of the Safe Drinking Water Act are met.

b. Where one or more maximum contaminant levels, treatment techniques, designated health advisory levels, or action levels cannot be met immediately, a compliance schedule for achieving compliance with standards may be made a condition of the permit. A compliance schedule requiring alterations in accordance with the standards for construction in 43.3(1) and 43.3(2) may also be included for any supply that, in the opinion of the director, contains a potential hazard.

c. If the department determines that a treatment method identified in 43.3(10) is technically feasible, the department may require the system to install or use that treatment method in connection with a compliance schedule issued under the provisions of 43.2(4)“b.” The department’s determination shall be based upon studies by the system and other relevant information.

43.2(5) The owner of a public water supply system shall notify the director within 30 days of any change in conditions identified in the permit application. This notice does not relieve the owner of the responsibility to obtain a construction permit as required by 43.3(455B).

43.2(6) Renewal of operation permits. Operation permits must be renewed prior to expiration every three years after initial issuance or following the expiration of an existing two-year permit in order to remain valid after October 1, 1992. The renewal date shall be specified in the permit or in any renewal. Application for renewal must be received by the director, or postmarked, 60 days prior to the renewal date, on forms provided by the department and shall be accompanied by the fee specified. During the first three-year period beginning January 1, 1993, and ending December 30, 1995, the department may issue permits for periods other than three years to provide for the eased transition from operation permit lengths of two to three years. After the initial transition period as defined above, operation permits will be renewed every three years (conforming to the compliance period as defined in 567—Chapter 40).

43.2(7) The director may deny renewal of, modify, suspend or rebate, in whole or in part, any operation permit for good cause. Denial of a new permit, renewal of an existing permit, or modification of a permit, may be appealed to the commission pursuant to 567—Chapter 7. Suspension or revocation may occur after hearing, pursuant to 567—Chapter 7. Good cause includes the following:

- a. Violation of any term or condition of the permit.
- b. Obtaining a permit by misrepresentation of fact or failure to disclose fully all material facts.
- c. A change in any condition that requires either a permanent or temporary modification of a permit condition.
- d. Failure to submit such records and information as the director may require both generally and as a condition of the operation permit in order to ensure compliance with conditions specified in the permit.
- e. Violation of any of the requirements contained in 567—Chapters 41 and 43.

567—43.3(455B) Public water supply system construction.

43.3(1) *Standards for public water supplies.* Any public water supply that does not meet the drinking water standards contained in 567—Chapters 41 and 43 shall make the alterations in accordance with the standards for construction contained in 43.3(2) necessary to comply with the drinking water standards unless the public water supply has been granted a variance from a maximum contaminant level or treatment technique as a provision of its operation permit pursuant to 43.2(455B), provided that the public water supply meets the schedule established pursuant to 43.2(455B). Any public water supply that, in the opinion of the director, contains a potential hazard shall make the alterations in accordance with the standards for construction contained in 43.3(2) necessary to eliminate or minimize that hazard.

43.3(2) *Standards for construction.*

a. The standards for a project are the department's "Iowa Water Supply Facilities Design Standards," the Ten States Standards, the American Water Works Association (AWWA) Standards as adopted through 1992 and 43.3(7) to 43.3(9). To the extent of any conflict between the Ten States Standards or the American Water Works Association Standards and the "Iowa Water Supply Facilities Design Standards" and 43.3(7) to 43.3(9), the standards of the "Iowa Water Supply Facilities Design Standards" and 43.3(7) to 43.3(9) shall prevail.

b. The chapters of the “Iowa Water Supply Facilities Design Standards” that apply to public water supply system projects and the date of adoption are:

<u>Chapter</u>	<u>Date of Adoption</u>
1. Project submittals	January 24, 1979
2. General design considerations	Reserved
3. Source development	April 25, 1979
4. Treatment	Reserved
5. Chemical application	Reserved
6. Pumping facilities	Reserved
7. Finished water storage	April 25, 1979
8. Iowa standards for water supply distribution systems	September 6, 1978

c. When engineering justification satisfactory to the director is provided substantially demonstrating that variation from the design standards will result in equivalent or improved effectiveness, such a variation from design standards may be accepted by the director. A variance denial may be appealed to the commission pursuant to 567—Chapter 7. Variance requests for projects qualifying for a waiver from the engineering requirement of 43.3(4) may be made without the retained services of a professional engineer.

43.3(3) Construction permits. No person shall construct, install or modify any project without first obtaining, or contrary to any condition of, a construction permit issued by the director or by a local public works department authorized to issue permits under 567—Chapter 9 except as provided in 43.3(3) “*b*,” 43.3(4) and 43.3(6). Construction permits are not required for point-of-use treatment devices installed by a noncommunity water system except those devices required by the department to meet a drinking water standard pursuant to 567—Chapters 41 and 43.

a. A permit to construct shall be issued by the director if the director concludes from the application and specifications submitted pursuant to 43.3(4) “*b*” and 567—40.4(455B) that the project will comply with the rules of the department.

**b.* Construction permit application.

(1) Application for any project shall be submitted to the department at least 30 days prior to the proposed date for commencing construction or awarding of contracts. This requirement may be waived when it is determined by the department that an imminent health hazard exists to the consumers of a public water supply. Under this waiver, construction, installation, or modification may be allowed by the department prior to review and issuance of a permit if all the following conditions are met:

1. The construction, installation or modification will alleviate the health hazard;
2. The construction is done in accordance with the standards for construction pursuant to 43.3(2);
3. Plans and specifications are submitted within 30 days after construction;
4. An engineer, registered in the state of Iowa, supervises the construction; and
5. The supplier of water receives approval of this waiver prior to any construction, installation, or modification.

(2) All construction permit applications shall be exempted from permit fee requirements.

43.3(4) Waiver from engineering requirements. The requirement for plans and specifications prepared by a registered engineer may be waived for the following types of projects, provided the improvement complies with the standards for construction. This waiver does not relieve the supplier of water from meeting the application and permit requirements pursuant to 43.3(3), except that the applicant need not obtain a written permit prior to installing the equipment.

*Effective date delayed until adjournment of the 1995 General Assembly by the Administrative Rules Review Committee at its meeting held March 13, 1995.

a. Simple chemical feed, if all the following conditions are met:

(1) The improvement consists only of a simple chemical solution application or installation, which in no way affects the performance of a larger treatment process, or is included as part of a larger treatment project;

(2) The chemical application is by a positive displacement pump (of the piston type with a solenoid operated diaphragm), the acceptability of said pump to be determined by the department;

(3) The supplier of water provides the department with a schematic of the installation and manufacturer's specifications sufficient enough to determine if the simple chemical feed installation meets, where applicable, standards for construction pursuant to 43.3(2);

(4) The final installation is approved based on an on-site review and inspection by department staff; and

(5) The installation includes only the prepackaged delivery of chemicals (from sacks, containers, or carboys) and does not include the bulk storage or transfer of chemicals (from a delivery vehicle).

b. Self-contained treatment unit, if all the following conditions are met:

(1) The installation is proposed for the purpose of eliminating a maximum contaminant level violation and is of a type which can be purchased "off the shelf," is self-contained requiring only a piping hookup for installation and operates throughout a range of 35 to 80 pounds per square inch;

(2) The plant is designed to serve no more than an average of 250 individuals per day;

(3) The department receives adequate information from the supplier of water on the type of treatment unit, such as manufacturer's specifications, a schematic indicating the installation's location within the system and any other information necessary for review by the department to determine if the installation will alleviate the maximum contaminant level violation; and

(4) The final installation is approved based on an on-site inspection by department staff.

43.3(5) *Project planning and basis of design.* An engineering report containing information and data necessary to determine the conformance of the project to the standards for construction and operation in 43.3(2) and the adequacy of the project to supply water in sufficient quantity and at sufficient pressure and of a quality that complies with drinking water standards pursuant to 567—Chapters 41 and 43 must be submitted to the department either with the project or in advance.

a. Such information and data must supply pertinent information as set forth in chapter 1 of the "Iowa Water Supply Facilities Design Standards."

b. The department may reject receipt or delay review of the plans and specifications until an adequate basis of design is received.

43.3(6) *Standard specifications for water main construction.* Standard specifications for water main construction by an entity may be submitted to the department or an authorized local public works department for approval. Such approval shall apply to all future water main construction by or for that entity for which plans are submitted with a statement requiring construction in accordance with all applicable approved standard specifications unless the standards for public water supply systems specified in 43.3(2) are modified subsequent to such approval and the standard specifications would not be approvable under the modified standards. In those cases where such approved specifications are on file, construction may commence 30 days following receipt of such plans by the department or an authorized local public works department if no response has been received indicating construction shall not commence until a permit is issued.

43.3(7) *Proposed raw or finished water site approval.*

a. *Approval required.* The site for each proposed raw water supply source or finished water below-ground level storage facility must be approved by the department prior to the submission of plans and specifications.

b. Criteria for approval. A site may be approved by the director if the director concludes that the criteria in this paragraph are met.

(1) A well site must be separated from sources of contamination by at least the distances specified in Table A.*

Drainage must be away from the well in all directions for a minimum radius of 15 feet.

After the well site has received preliminary approval from the department, the owner of the proposed public well shall submit proof of legal control of contiguous land, through purchase, lease, easement, ordinance, or other similar means that ensures that the siting criteria for distances of 200 feet or less described in the above table will be maintained for the life of the well. Such control shall also provide for a minimum separation distance of at least 200 feet between a public well and sources of contamination listed in Table A* with distances equal to or greater than 200 feet. Proof of legal control should be submitted as part of the construction permit application and shall be submitted prior to issuance of a permit to construct.

When a proposed well is located in an existing well field and will withdraw water from the same aquifer as the existing well or wells, individual separation distances may be waived if substantial historical data is available indicating that no contamination has resulted.

(2) The applicant must submit proof that a proposed surface water source can, through readily available treatment methodology, comply with 567—Chapter 41 and that the raw water source is adequately protected against potential health hazards including, but not limited to, point source discharges, hazardous chemical spills, and the potential sources of contamination listed in Table A.*

After a surface water impoundment has received preliminary approval from the department for use as a raw water source, the owner of the water supply system shall submit proof of legal control through ownership, lease, easement, or other similar means, of contiguous land for a distance of 400 feet from the shoreline at the maximum water level. Legal control shall be for the life of the impoundment and shall control location of sources of contamination within the 400-foot distance. Proof of legal control should be submitted as part of the construction permit application and shall be submitted prior to issuance of a permit to construct.

(3) The minimum separation between a below-ground level finished water storage facility and any source of contamination, listed in Table A as being 50 feet or more, shall be 50 feet. Separation distances listed in Table A as being less than 50 feet shall apply to a below-ground level finished water storage facility.

(4) Greater separation distances may be required where necessary to ensure that no adverse effects to water supplies or the existing environment will result. Lesser separation distances may be considered if detailed justification is provided by the applicant's engineer showing that no adverse effects will result from a lesser separation distance, and the regional staff recommends approval of the lesser distance. Such exceptions must be based on special construction techniques or localized geologic or hydrologic conditions.

c. New source water monitoring. Water quality monitoring shall be conducted on all new water sources and results submitted to the department prior to placing the new water source into service.

(1) Water samples shall be collected from each new water source and analyzed for all appropriate contaminants as specified in 567—Chapter 41 consistent with the particular water system classification. If multiple new sources are being added, compositing of the samples (within a single system) shall be allowed in accordance with the composite sampling requirements outlined in 567—Chapter 41. Subsequent water testing shall be conducted consistent with the water system's water supply operation permit monitoring schedule.

*See end of chapter for TABLE A.

(2) Water samples collected from groundwater sources in accordance with 43.3(7)“c”(1) shall be conducted at the conclusion of the drawdown/yield test pumping procedure, with the exception of bacteriological monitoring. Bacteriological monitoring must be conducted after disinfection of each new well and subsequent pumping of the chlorinated water to waste. Water samples should also be analyzed for alkalinity, pH, calcium, chloride, copper, hardness, iron, magnesium, manganese, potassium, silica, specific conductance, sodium, sulfate, filterable and nonfilterable solids, and zinc.

(3) Water samples collected from surface water sources in accordance with 43.3(7)“c”(1) should be collected prior to the design of the surface water treatment facility and shall be conducted and analyzed prior to utilization of the source. The samples shall be collected during June, July, and August. In addition, quarterly monitoring shall be conducted in March, June, September, and December at a location representative of the raw water at its point of withdrawal. Monitoring shall be for turbidity, alkalinity, pH, calcium, chloride, color, copper, hardness, iron, magnesium, manganese, potassium, silica, specific conductance, sodium, sulfate, filterable and nonfilterable solids, carbonate, bicarbonate, algae (qualitative and quantitative), total organic carbon, five-day biochemical oxygen demand, dissolved oxygen, surfactants, nitrogen series (organic, ammonia, nitrite, and nitrate), and phosphate.

43.3(8) *Water vessel coating, water vessel preservative, and all chemical addition.* Water vessel coating, water vessel preservative or any chemical added to the raw, partially treated, or finished water must be suitable for the intended use in a potable water system. The person seeking to supply or use the coating, preservative, or chemical has the burden of proof that the chemical or coating or preservative is not toxic or otherwise a potential hazard in a potable public water supply system. The department may require complete chemical analysis of the chemical, coating or preservative.

43.3(9) *Water treatment filter media material.* For single media filters, grain sizes up to 0.8 mm effective size may be approved for filters designed to remove constituents other than those contained in the primary drinking water standards. Pilot or full-scale studies demonstrating satisfactory treatment efficiency and operation with the proposed media will be required prior to issuing any construction permits which allow filter media sizes greater than 0.55 mm.

43.3(10) *Best available treatment technology.*

a. The department identifies the technologies listed in the following table as the best available technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for organic chemicals listed in 567—subparagraphs 41.5(1)“b”(1) and (2).

Best Available Technologies for Organic Chemicals

<u>Contaminant</u>	<u>Packed Tower Aeration</u>	<u>Granulated Activated Carbon</u>
Benzene	x	x
Carbon tetrachloride	x	x
1,2-Dichloroethane	x	x
Trichloroethylene	x	x
para-Dichlorobenzene	x	x
1,1-Dichloroethylene	x	x
1,1,1-Trichloroethane	x	x
Vinyl Chloride		x
cis-1,2-Dichloroethylene	x	x
1,2-Dichloropropane	x	x
Ethylbenzene	x	x
Monochlorobenzene	x	x
o-Dichlorobenzene	x	x
Styrene	x	x
Tetrachloroethylene	x	x
Toluene	x	x
trans-1,2-Dichloroethylene	x	x
Xylenes (total)	x	x
Alachlor		x
Aldicarb		x
Aldicarb sulfoxide		x
Aldicarb sulfone		x
Atrazine		x
Carbofuran		x
Chlordane		x
Dibromochloropropane	x	x
2,4-D		x
Ethylene dibromide	x	x
Heptachlor		x
Heptachlor epoxide		x
Lindane		x
Methoxychlor		x
PCBs		x
Pentachlorophenol		x
Toxaphene		x
2,4,5-TP		x

b. BATs for inorganic compounds. The department identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for the inorganic contaminants listed in 567—paragraph 41.3(1) “b.”

INORGANIC CHEMICAL NAME	BAT (s)
Asbestos	2, 3, 8
Barium	5, 6, 7, 9
Cadmium	2, 5, 6, 7
Chromium	2, 5, 6**, 9
Mercury	2*, 4, 6*, 7
Nitrate	5, 7, 9
Nitrite	5, 9
Selenium	1, 2***, 6, 7, 9

Key to BATs in Table

- | | | |
|-------------------------------------|-------------------------------|-----------------------|
| 1 = Activated Alumina | 4 = Granular Activated Carbon | 7 = Reverse Osmosis |
| 2 = Coagulation/Filtration | 5 = Ion Exchange | 8 = Corrosion Control |
| 3 = Direct and Diatomite Filtration | 6 = Lime Softening | 9 = Electrodialysis |

- *BAT only if influent Hg concentration is less than 10 micrograms/liter.
- **BAT for Chromium III only
- ***BAT for Selenium IV only

c. Requirement to install BAT. The department shall require community water systems and non-transient noncommunity water systems to install and use any treatment method identified in 43.3(10) as a condition for granting an interim contaminant level except as provided in paragraph “d.” If, after the system’s installation of the treatment method, the system cannot meet the maximum contaminant level, the system shall be eligible for a compliance schedule with an interim contaminant level granted under the provisions of 567—subrule 41.10(3) and 43.2(455B).

d. Engineering assessment option. If a system can demonstrate through comprehensive engineering assessments, which may at the direction of the department include pilot plant studies, that the treatment methods identified in 43.3(10) would only achieve a de minimis reduction in contaminants, the department may issue a schedule of compliance that requires the system being granted the variance to examine other treatment methods as a condition of obtaining the interim contaminant level.

e. Compliance schedule. If the department determines that a treatment method identified in 43.3(10) “a” and “b” is technically feasible, the department may require the system to install or use that treatment method in connection with a compliance schedule issued under the provisions of 567—subrule 41.10(3) and 43.2(455B). The determination shall be based upon studies by the system and other relevant information.

f. Avoidance of unacceptable risk to health (URTH). The department may require a public water system to use bottled water, point-of-use devices, point-of-entry devices or other means as a condition of granting a variance or an exemption from the requirements of 43.3(10) to avoid an unreasonable risk to health.

567—43.4(455B) Certification of completion. Within 30 days after completion of construction, installation or modification of any project, the permit holder shall submit a certification by a registered professional engineer that the project was completed in accordance with the approved plans and specifications except if the project received a waiver pursuant to 43.3(4).

567—43.5(455B) Filtration and disinfection.

43.5(1) Applicability/general requirements.

a. These rules apply to community and noncommunity public water supply systems using surface water or groundwater under the direct influence of surface water in whole or in part. The rules establish criteria under which filtration is required as a treatment technique. In addition, these rules establish treatment technique requirements in lieu of maximum contaminant levels for *Giardia lamblia*, heterotrophic bacteria, *Legionella*, viruses and turbidity. Each public water system with a surface water source or a groundwater source under the direct influence of surface water must provide treatment of that source water which complies with these treatment technique requirements. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

(1) At least 99.9 percent (3-log) removal or inactivation of *Giardia lamblia* cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer; and

(2) At least 99.99 percent (4-log) removal or inactivation of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

b. Criteria for identification of groundwater under the direct influence of surface water. "Groundwater under the direct influence of surface water" means any water beneath the surface of the ground with: (1) significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia*, or (2) significant and relatively rapid shifts in water characteristics such as turbidity (particulate content), temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Direct influence must be determined for individual sources in accordance with criteria established by the department. The department determination of direct influence may be based on site-specific measurements of water quality or documentation of well construction characteristics and geology with field evaluation. Only surface water and groundwater sources under the direct influence of surface water that are at risk to the contamination from *Giardia* cysts are subject to the requirements of this rule. Groundwater sources shall not be subject to this rule. The evaluation process shall be used to delineate between surface water, groundwater under the direct influence of surface water and groundwater. The identification of a source as surface water and groundwater under the direct influence of surface water shall be determined for an individual source, by the department, in accordance with the following criteria. The public water supply shall provide to the department that information necessary to make the determination. The evaluation process will involve one or more of the following steps:

(1) Preliminary review. The department shall conduct a preliminary evaluation of information on the source provided by the public water supply to determine if the source is an obvious surface water (i.e., pond, lake, stream, etc.) or groundwater under the direct influence of surface water. The source shall be evaluated during that period of highest susceptibility to influence from surface water. The preliminary evaluation may include a review of surveys, reports, geological information of the area, physical properties of the source, and a review of departmental and public water system records. If the source is identified as a surface water, no additional evaluation shall be conducted. If the source is a groundwater and identified as a deep well, it shall be classified as a groundwater not under the direct influence of surface water and no additional evaluation shall be conducted, unless through direct knowledge or documentation the source does not meet the requirements of 43.5(1)“b”(2). The deep well shall then be evaluated in accordance with 43.5(1)“b”(3). If the source is a shallow well, the source shall be evaluated in accordance with 43.5(1)“b”(2). If the source is a spring, infiltration gallery, Ranney well, or any other subsurface source, it shall be evaluated in accordance with 43.5(1)“b”(3).

(2) Well source evaluation. Shallow wells greater than 50 feet in lateral distance from a surface water source shall be evaluated for direct influence of surface water through a review of departmental or public water system files in accordance with 43.5(1)“b”(2)“1,” first unnumbered paragraph, and 43.5(1)“b”(2)“2.” Sources that meet the criteria shall be considered to be not under the direct influence of surface water. No additional evaluation will be required. Shallow wells 50 feet or less in lateral distance from a surface water shall be in accordance with 43.5(1)“b”(3) and (4).

1. Well construction criteria. The well shall be constructed so as to include:

- A surface sanitary seal using bentonite clay, concrete, or other acceptable material.
- The well casing shall penetrate a confining bed.
- The well casing shall be perforated or screened only below a confining bed.

2. Water quality criteria. Water quality records shall indicate:

- No record of total coliform or fecal coliform contamination in untreated samples collected over the past three years.
- No history of turbidity problems associated with the well, other than turbidity as a result of inorganic chemical precipitates.
- No history of known or suspected outbreak of Giardia or other pathogenic organisms associated with surface water (e.g., Cryptosporidium) which has been attributed to the well.

3. Other available data. If data on particulate matter analysis of the well are available, there shall be no evidence of particulate matter present that is associated with surface water. If information on turbidity or temperature monitoring of the well and nearby surface water is available, there shall be no data on the source which correlates with that of a nearby surface water.

4. Wells that do not meet all the requirements listed shall require further evaluation in accordance with 43.5(1)“b”(3) and (4).

(3) Formal evaluation. The evaluation shall be conducted by the department or registered engineer at the direction of the public water supply. The evaluation shall include:

1. Complete file review. In addition to the information gathered in 43.5(1)“b”(1), the complete file review shall consider but not be limited to: design and construction details; evidence of direct surface water contamination; water quality analysis; indications of waterborne disease outbreaks; operational procedures; and customer complaints regarding water quality or water-related infectious illness. Sources other than a well source shall be evaluated in a like manner to include a field survey.

2. Field survey. A field survey shall substantiate findings of the complete file review and determine if the source is at risk to pathogens from direct surface water influence. The field survey shall examine the following criteria for evidence that surface water enters the source through defects in the source which include but are not limited to: a lack of a surface seal on wells, infiltration gallery laterals exposed to surface water, springs open to the atmosphere, surface runoff entering a spring or other collector, and distances to obvious surface water sources.

A report summarizing the findings of the complete file review and field survey shall be submitted to the department for final review and classification of the source. If the complete file review or field survey demonstrates conclusively that the source is subject to the direct surface water influence, the source shall be classified as under the direct influence of surface water. Either method or both may be used to demonstrate that the source is a surface water or groundwater under the direct influence of surface water. If the findings do not demonstrate conclusive evidence of direct influence of surface water, the analysis outlined in 43.5(1) "b"(4) should be conducted.

(4) Particulate analysis and physical properties evaluation.

1. Surface water indicators. Particulate analysis shall be conducted to identify organisms which only occur in surface waters as opposed to groundwaters, and whose presence in a groundwater would indicate the direct influence of surface water.

- Identification of a *Giardia* cyst, live diatoms, and blue-green, green, or other chloroplast containing algae in any source water shall be considered evidence of direct surface water influence.

- Rotifers and insect parts are indicators of surface water. Without knowledge of which species is present, the finding of rotifers indicates that the source is either directly influenced by surface water, or the water contains organic matter sufficient to support the growth of rotifers. Insects or insect parts shall be considered strong evidence of surface water influence, if not direct evidence.

- The presence of coccidia (e.g., *Cryptosporidium*) in the source water is considered a good indicator of direct influence of surface water. Other macroorganisms (greater than 7 μ m) which are parasitic to animals and fish such as, but not limited to, helminths (e.g., tapeworm cysts), ascaris, and *Diphylobothrium*, shall be considered as indicators of direct influence of surface water.

2. Physical properties. Turbidity, temperature, pH and conductivity provide supportive, but less direct, evidence of direct influence of surface water. Turbidity fluctuations of greater than 0.5-1.0 NTU over the course of a year may be indicative of direct influence of surface water. Temperature fluctuations may also indicate surface water influence. Changes in other chemical parameters such as pH, conductivity, or hardness may also give an indirect indication of influence by nearby surface water.

c. A public water system using a surface water source or a groundwater source under the direct influence of surface water is considered to be in compliance with the requirements of this subrule if it meets the filtration requirements in 43.5(3) and the disinfection requirements in 43.5(2) in accordance with the effective dates specified within the respective subrules.

d. Each public water system using a surface water source or a groundwater source under the direct influence of surface water must be operated by a certified operator who meets the requirements of 567—Chapter 81.

43.5(2) Disinfection. All community and noncommunity public water supply systems using surface water or groundwater under the direct influence of surface water in whole or in part shall be required to provide disinfection in compliance with this subrule and filtration in compliance with 43.5(3). If the department has determined that filtration is required, the system must comply with any interim disinfection requirements the department deems necessary before filtration is installed. A system providing filtration on or before December 30, 1991, must meet the disinfection requirements of this subrule beginning June 29, 1993. A system providing filtration after December 30, 1991, must meet the disinfection requirements of this subrule when filtration is installed. Failure to meet any requirement of this subrule after the applicable date specified in this subrule is a treatment technique violation. The disinfection requirements are as follows:

a. The disinfection treatment must be sufficient to ensure that the total treatment processes of that system achieve at least 99.9 percent (3-log) inactivation or removal of *Giardia lamblia* cysts and at least 99.99 percent (4-log) inactivation or removal of viruses, acceptable to the department.

b. The disinfection system must include:

(1) Redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system, or

(2) Automatic shutoff of delivery of water to the distribution system whenever there is less than 0.3 mg/l of residual disinfectant concentration in the water. If the department determines that automatic shutoff would cause unreasonable risk to health or interfere with fire protection, the system must comply with 43.5(2)“b”(1).

c. Disinfectant residual entering system. The residual disinfectant concentration in the water entering the distribution system, measured as specified in 567—paragraphs 41.7(2)“c” and “e,” cannot be less than 0.3 mg/l free residual chlorine for more than four hours.

d. Disinfectant residual in the system. The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in 567—paragraphs 41.7(2)“c” and “e,” cannot be undetectable in more than 5 percent of the samples each month for any two consecutive months that the system serves water to the public. Water within the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in 567—paragraph 41.2(3)“e,” is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Therefore, the value “V” in the following formula cannot exceed 5 percent in one month for any two consecutive months.

$$V = \frac{c + d + e}{a + b} \times 100$$

where:

a = number of instances where the residual disinfectant concentration is measured;

b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d = number of instances where no residual disinfectant concentration is detected and where the HPC is greater than 500/ml; and

e = number of instances where the residual disinfectant concentration is not measured and HPC is greater than 500/ml.

43.5(3) Filtration. A public water system that uses a surface water source or a groundwater source under the direct influence of surface water must provide treatment consisting of both disinfection, as specified in 43.5(2), and filtration treatment which complies with the turbidity requirements of 567—subrule 41.7(1). A system providing or required to provide filtration on or before December 30, 1991, must meet the requirements of 567—subrule 41.7(1) by June 29, 1993. A system providing or required to provide filtration after December 30, 1991, must meet the requirement of 567—subrule 41.7(1) when filtration is installed. A system shall install filtration within 18 months after the department determines, in writing, that filtration is required. The department may require and the system shall comply with any interim turbidity requirements the department deems necessary. Failure to meet any requirements of the referenced subrules after the dates specified is a treatment technique violation.

43.5(4) Analytical and monitoring requirements.

a. Analytical requirements. Only the analytical method(s) specified in this paragraph, or otherwise approved by the department, may be used to demonstrate compliance with the requirements of 43.5(2) and 43.5(3). Measurements for pH, temperature, turbidity, and residual disinfectant concentrations must be conducted by a Grade II, III or IV operator meeting the requirements of 567—Chapter 81, any person under the supervision of a Grade II, III or IV operator meeting the requirements of 567—Chapter 81, or a laboratory certified by the department to perform analysis under 567—Chapter 83. Measurements for heterotrophic plate count bacteria must be conducted by a laboratory certified by the department to do such analysis. Until laboratory certification criteria are developed for the analysis of heterotrophic plate count bacteria, any laboratory certified for total coliform analysis by the department is certified for heterotrophic plate count bacteria analysis unless notified otherwise by the department. The procedures shall be performed in accordance with 567—Chapters 41 and 83 as listed below and the referenced publications.

- (1) Heterotrophic plate count-567—subrule 41.2(3)
- (2) Turbidity-567—subrule 41.7(1)
- (3) Residual disinfectant concentration-567—subrule 41.7(2)
- (4) Temperature-567—subrule 41.7(3)
- (5) pH-567—subrule 41.7(4)

b. Monitoring requirements. A public water system that uses a surface water source or a ground-water source under the influence of surface water must monitor in accordance with this paragraph or some interim requirements required by the department, until filtration is installed.

(1) Turbidity measurements to demonstrate compliance with 43.5(3) shall be performed in accordance with 567—subrule 41.7(1).

(2) Residual disinfectant concentration of the water entering the distribution system to demonstrate compliance with 43.5(2)“d” shall be monitored in accordance with 567—subparagraph 41.7(2)“c”(1).

(3) The residual disinfectant concentration of the water in the distribution system to demonstrate compliance with 43.5(2)“d” shall be monitored in accordance with 567—subparagraph 41.7(2)“c”(2).

(4) Reporting and response to violation. Public water supplies shall report the results of routine monitoring required to demonstrate compliance with 43.5(455B) and treatment technique violations as follows:

1. Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, must report that occurrence to the department as soon as possible, but no later than by the end of the next business day.

2. If at any time the turbidity exceeds 5 NTU, the system must inform the department as soon as possible, but no later than the end of the next business day.

3. If at any time the residual falls below 0.3 mg/l in the water entering the distribution system, the system must notify the department as soon as possible, but no later than by the end of the next business day. The system also must notify the department by the end of the next business day whether or not the residual was restored to at least 0.3 mg/l within four hours.

4. Routine monitoring results shall be provided as part of the monthly operation reports in accordance with 567—40.3(455B) and 43.7(3).

567—43.6(455B) Disinfectant and disinfectant by-products. Reserved.

567—43.7(455B) Operation and maintenance for public water supplies.**43.7(1) *Records of operation required.***

a. Monthly records of operation shall be completed by all public water supplies, on forms provided by the department or on similar forms, unless a public water supply meets all of the following conditions:

(1) Supplies an annual average of not more than 25,000 gpd or serves no more than an average of 250 individuals daily;

(2) Does not provide any type of treatment;

(3) Does not utilize surface water either in whole or in part as a water source.

The reports shall be completed as described in 43.7(1) "b" and maintained at the facility for inspection by the department for a period of five years.

b. Monthly operation reports shall be completed as follows:

(1) Pumpage. Noncommunity supplies shall measure and record the total water used each week. It is recommended that a daily measurement and recording be made. Community supplies shall measure and record daily water used. Reporting of pumpage may be required in an operation permit where needed to verify MCL compliance.

(2) Treatment effectiveness. Where treatment is practiced, the intended effect of the treatment shall be measured at locations and by methods which best indicate effectiveness of the treatment process. These measurements shall be made pursuant to Table B* of this rule.

(3) Treatment effectiveness for a primary standard. Where the raw water does not comply with 567—41.2(455B) to 41.8(455B) and treatment is practiced for the purpose of complying with a primary drinking water standard, daily measurement of the primary standard constituent or an appropriate indicator constituent designated by the department shall be recorded. The department may require reporting of these results in the operation permit to verify MCL compliance.

(4) Treatment effectiveness for a secondary standard. Where treatment is practiced for the purpose of achieving the recommended level of any constituent designated in the federal secondary standards, measurements shall be recorded as specified in Table B*.

(5) Chemical application. Chemicals such as fluoride, iodine, bromine and chlorine, which are potentially toxic in excessive concentration, shall be measured and recorded daily. Recording shall include the amount of chemical applied each day. Where the supplier of water is attempting to maintain a residual of the chemical throughout the system, such as fluoride or chlorine, the residual in the system shall be recorded daily. The quantity of all other chemicals applied shall be measured and recorded at least once each week.

(6) Static water levels and pumping water levels must be measured and recorded once per month for all groundwater sources in accordance with guidelines provided by the department. More or less frequent measurements may be approved by the department where historical data justifies it.

43.7(2) *Chemical application.* The supplier of water shall keep a record of all chemicals used. This record should include a clear identification of the chemical by brand or generic name and the dosage rate. When chemical treatment is applied with the intent of obtaining an in-system residual, the residuals will be monitored regularly. When chemical treatment is applied and in-system residuals are not expected, the effectiveness of the treatment will be monitored through an appropriate indicative parameter.

*See end of chapter for Table B.

a. Continuous disinfection.

(1) When required. Continuous disinfection must be provided at all public water supply systems, except for: groundwater supplies that have no treatment facilities or have only fluoride, sodium hydroxide or soda ash addition and that meet the bacterial standards as provided in 567—41.2(455B) and do not show other actual or potential hazardous contamination by microorganisms.

(2) Method. Chlorine is the preferred disinfecting agent. Chlorination may be accomplished with liquid chlorine, calcium or sodium hypochlorites or chlorine dioxide. Other disinfecting agents will be considered, provided a residual can be maintained in the distribution system, reliable application equipment is available and testing procedures for a residual are recognized in "Standard Methods."

(3) Chlorine residual. A minimum free available chlorine residual of 0.3 mg/l or a minimum total available chlorine residual of 1.5 mg/l must be continuously maintained throughout the water distribution system, except for those points on the distribution system that terminate as dead ends or areas that represent very low use when compared to usage throughout the rest of the distribution system as determined by the department.

(4) Test kit. A test kit capable of measuring free and combined chlorine residuals in increments no greater than 0.1 mg/l in the range below 0.5 mg/l, and in increments no greater than 0.2 mg/l in the range from 0.5 mg/l to 1.0 mg/l, and in increments no greater than 0.3 mg/l in the range from 1.0 mg/l to 2.0 mg/l must be provided at all chlorination facilities. The test kit must use a method of analysis that is recognized in "Standard Methods."

(5) Leak detection, control and operator protection. A bottle of at least 56 percent ammonium hydroxide must be provided at all gas chlorination installations for leak detection. Leak repair kits must be available where ton chlorine cylinders are used.

(6) Other disinfectant residuals. If an alternative disinfecting agent is approved by this department, the residual levels and type of test kit used will be assigned by the department in accordance with and based upon analytical methods contained in "Standard Methods."

b. Phosphate compounds.

(1) When phosphate compounds are to be added to any public water supply system which includes iron or manganese removal or ion exchange softening, such compounds must be applied after the iron or manganese removal or ion exchange softening treatment units, unless the director has received and approved an engineering report demonstrating the suitability for addition prior to these units in accordance with the provisions of 43.3(2). The department may require the discontinuance of phosphate addition where it interferes with other treatment processes, the operation of the water system or if there is a significant increase in biological populations associated with phosphate application.

(2) The total phosphate concentration in the finished water must not exceed 10 mg/l as PO_4 .

(3) Chlorine shall be applied to the phosphate solution in sufficient quantity to give an initial concentration of 10 mg/l in the phosphate solution. A chlorine residual must be maintained in the phosphate solution at all times.

(4) Test kits capable of measuring polyphosphate and orthophosphate in a range from 0.0 to 10.0 mg/l in increments no greater than 2.0 mg/l must be provided.

(5) Continuous application or injection of phosphate compounds directly into a well is prohibited.

c. Hydrofluosilicic acid. Where hydrofluosilicic acid is added to a public water supply, the operator shall be equipped with a fluoride test kit with a minimum range of from 0.0 to 2.0 mg/l in increments no greater than 0.1 mg/l. Distilled water and standard fluoride solutions of 0.2 mg/l and 1.0 mg/l must be provided.

43.7(3) Reporting and record-keeping requirements for systems using surface water and ground-water under the direct influence of surface water. In addition to the monitoring requirements required by 43.7(1) and 43.7(2), a public water system that uses a surface water source or a groundwater source under the direct influence of surface water must report monthly to the department the information specified in this subrule beginning June 29, 1993, or when filtration is installed, whichever is later.

a. Turbidity measurements as required by 567—subrule 41.7(1) and 43.5(3) must be reported within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

- (1) The total number of filtered water turbidity measurements taken during the month.
- (2) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in 567—paragraph 41.7(1)“b” for the filtration technology being used.
- (3) The date and value of any turbidity measurements taken during the month which exceed 5 NTU.

b. Disinfection information specified in 567—subrules 41.7(2) and 43.7(2) must be reported to the department within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

(1) For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.

(2) The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.3 mg/l and when the department was notified of the occurrence.

(3) The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to 567—paragraph 41.2(1)“c”:

1. Number of instances where the residual disinfectant concentration is measured;
2. Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
3. Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;
4. Number of instances where no residual disinfectant concentration is detected and where HPC is > 500/ml;
5. Number of instances where the residual disinfectant concentration is not measured and HPC is > 500/ml; and
6. For the current and previous month the system serves water to the public, the value of “V” in the following formula:

$$V = \frac{c + d + e}{a + b} \times 100$$

where:

- a = the value in “b”(3)“1” of this subrule,
 b = the value in “b”(3)“2” of this subrule,
 c = the value in “b”(3)“3” of this subrule,
 d = the value in “b”(3)“4” of this subrule, and
 e = the value in “b”(3)“5” of this subrule.

567—43.8(455B) Lead and copper treatment techniques.**43.8(1) Corrosion control.**

a. Applicability of corrosion control treatment steps to small, medium-size and large water systems. (Corrosion control treatment compliance dates.) Systems shall complete the applicable corrosion control treatment requirements by the following deadlines:

(1) Large systems (serving greater than 50,000 persons) shall complete the corrosion control treatment steps specified in 43.8(1) “d,” unless it is deemed to have optimized corrosion control under 43.8(1) “b”(2) or (3).

(2) Small systems (serving less than or equal to 3,300 persons) and medium-size systems (serving greater than 3,300 and less than or equal to 50,000 persons) shall complete the corrosion control treatment steps specified in 43.8(1) “e,” unless it has optimized corrosion control under 43.8(1) “b”(1), (2), or (3).

b. Optimum corrosion control. A public water supply system has optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in this section if the system satisfies one of the following criteria:

(1) A small or medium-size water supply system has optimized corrosion control if the system meets the lead and copper action levels during each of two consecutive six-month monitoring periods.

(2) Any public water supply system may be deemed to have optimized corrosion control treatment if the system demonstrates it has conducted activities equivalent to the corrosion control steps applicable to such system under this section. If the department makes this determination, it shall provide the water supply system with written notice explaining the basis for its decision and shall specify the water quality control parameters representing optimal corrosion control in accordance with 43.8(2) “f.” A system shall provide the department with the following information in order to support a determination under this paragraph:

1. The results of all test samples collected for each of the water quality parameters in 43.8(2) “c”(3);

2. A report explaining the test methods used by the water system to evaluate the corrosion control treatments listed in 43.8(2) “c”(1), the results of all tests conducted, and the basis for the system’s selection of optimal corrosion control treatment;

3. A report explaining how corrosion control has been installed and how it is being maintained to ensure minimal lead and copper concentrations at consumers’ taps; and

4. The results of tap water samples collected in accordance with 567—paragraph 41.4(1) “c” at least once every six months for one year after corrosion control has been installed.

(3) Any water system has optimized corrosion control if it submits results of tap water monitoring conducted in accordance with 567—paragraph 41.4(1) “c” and source water monitoring conducted in accordance with 567—paragraph 41.4(1) “e” that demonstrates for two consecutive six-month monitoring periods that the difference between the ninetyth percentile tap water lead level computed under 567—subparagraph 41.4(1) “b”(3) and the highest source water lead concentration, is less than the Practical Quantitation Level for lead specified in 567—subparagraph 41.4(1) “g”(2).

c. Any small or medium-size water system that is required to complete the corrosion control steps due to its exceedance of the lead or copper action level may cease completing the treatment steps whenever the system meets both action levels during each of two consecutive monitoring periods conducted pursuant to 567—paragraph 41.4(1) “c” and submits the results to the department. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The department may require a system to repeat treatment steps previously completed by the system where it is determined that this is necessary to implement properly the treatment requirements of this section. The department shall notify the system in writing of such a determination and explain the basis for its decision.

d. Treatment steps and deadlines for large systems. Except as provided in 43.8(1)“*b*”(2) or (3), large systems shall complete the following corrosion control treatment steps (described in the referenced portions of 43.8(1)“*b*,” 43.8(2), 567—paragraphs 41.4(1)“*c*” and “*d*”) by the dates indicated below.

(1) Step 1. The system shall conduct initial monitoring pursuant to 567—numbered paragraph 41.4(1)“*c*”(4)“1” and 567—subparagraph 41.4(1)“*d*”(2) during two consecutive six-month monitoring periods by January 1, 1993.

(2) Step 2. The system shall complete corrosion control studies pursuant to 43.8(2)“*c*” by July 1, 1994.

(3) Step 3. The department will designate optimal corrosion control treatment within six months of receiving the corrosion control study results (by January 1, 1995).

(4) Step 4. The system shall install optimal corrosion control treatment by January 1, 1997.

(5) Step 5. The system shall complete follow-up sampling pursuant to 567—numbered paragraph 41.4(1)“*c*”(4)“2” and 567—subparagraph 41.4(1)“*d*”(3) by January 1, 1998.

(6) Step 6. The department will review installation of treatment and designate optimal water quality control parameters pursuant to 43.8(2)“*f*” by July 1, 1998.

(7) Step 7. The system shall operate in compliance with optimal water quality control parameters delineated by the department and continue to conduct tap sampling.

e. Treatment steps and deadlines for small and medium-size systems. Except as provided in 43.8(2), small and medium-size systems shall complete the following corrosion control treatment steps (described in 43.8(2) and 567—paragraphs 41.4(1)“*c*” and “*d*” by the indicated time periods listed below.

(1) Step 1. The system shall conduct initial tap sampling pursuant to 567—numbered paragraph 41.4(1)“*c*”(4)“1” and 567—subparagraph 41.4(1)“*d*”(2) until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under 567—numbered paragraph 41.4(1)“*c*”(4)“4.” A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment under 43.8(2)“*a*” within six months after it exceeds one of the action levels.

(2) Step 2. Within 12 months after a system exceeds the lead or copper action level, the department may require the system to perform corrosion control studies under 43.8(2)“*b*.” If the system is not required to perform such studies, the department will specify optimal corrosion control treatment under 43.8(2)“*d*” as follows: for medium-size systems, within 18 months after such system exceeds the lead or copper action level, and, for small systems, within 24 months after such system exceeds the lead or copper action level.

(3) Step 3. If a system is required to perform corrosion control studies under Step 2, the system shall complete the studies (under 43.8(2)“*c*”) within 18 months after such studies are required to commence.

(4) Step 4. If the system has performed corrosion control studies under Step 2, the department shall designate optimal corrosion control treatment under 43.8(2)“*d*” within six months after completion of Step 3.

(5) Step 5. The system shall install optimal corrosion control treatment under 43.8(2)“*e*” within 24 months after such treatment is designated.

(6) Step 6. The system shall complete follow-up sampling pursuant to 567—numbered paragraph 41.4(1)“*c*”(4)“2” and 567—subparagraph 41.4(1)“*d*”(3) within 36 months after optimal corrosion control treatment is designated.

(7) Step 7. The department shall review the system's installation of treatment and designate optimal water quality control parameters pursuant to 43.8(2) "f" within six months after completion of Step 6.

(8) Step 8. The system shall operate in compliance with the designated optimal water quality control parameters under 43.8(2) "f" (and continue to conduct tap sampling as per 567—numbered paragraph 41.4(1) "c"(4)"3" and 567—subparagraph 41.4(1) "d"(4)).

43.8(2) *Description of corrosion control treatment requirements.* Each public water supply system shall complete the corrosion control treatment requirements described below which are applicable to such systems under 43.8(1).

a. Public water supply system recommendation regarding corrosion control treatment. Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, small and medium-size water systems exceeding the lead or copper action level shall recommend installation of one or more of the corrosion control treatments listed in 43.8(2) "c" which the system believes constitutes optimal corrosion control for that system. The department may require the system to conduct additional water quality parameter monitoring in accordance with 567—subparagraph 41.4(1) "d"(2) to assist in reviewing the system's recommendation.

b. Department decision to require studies of corrosion control treatment (applicable to small and medium-size systems). The department may require any small or medium-size system that exceeds the lead or copper action level to perform corrosion control studies under 43.8(2) "c" to identify optimal corrosion control treatment for the system.

c. Performance of corrosion control studies.

(1) Any public water supply system performing corrosion control studies shall evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment: alkalinity and pH adjustment; calcium hardness adjustment; and the addition of a phosphate or silicate based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples.

(2) The water system shall evaluate each of the corrosion control treatments using either pipe rig/loop tests, metal coupon tests, partial-system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry and distribution system configuration.

(3) The public water supply system shall measure the following water quality parameters in any tests conducted under this paragraph before and after evaluating the corrosion control treatments listed above:

1. Lead;
2. Copper;
3. pH;
4. Alkalinity;
5. Calcium;
6. Conductivity;
7. Orthophosphate (when an inhibitor containing a phosphate compound is used);
8. Silicate (when an inhibitor containing a silicate compound is used);
9. Water temperature.

(4) The public water supply system shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and outline such constraints with: documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics; or documentation demonstrating that the water system has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes.

(5) The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes.

(6) On the basis of an analysis of the data generated during each evaluation, the water system shall recommend in writing to the department the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation required by 43.8(2) "c" (1) through (5).

d. Department designation of optimal corrosion control treatment.

(1) Based upon consideration of available information including, where applicable, studies performed under 43.8(2) "c" and a system's recommended treatment alternative, the department shall either approve the corrosion control treatment option recommended by the public water supply system, or designate alternative corrosion control treatment(s) from among those listed in 43.8(2) "c." The department shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes (when designating optimal corrosion control treatment).

(2) The department shall notify the public water supply system of its decision on optimal corrosion control treatment in writing and explain the basis for this determination. If the department requests additional information to aid its review, the public water supply system shall provide the information.

e. Installation of optimal corrosion control. Each public water supply system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated under 43.8(2) "d."

f. Department review of treatment and specification of optimal water quality control parameters.

(1) The department shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the public water supply system and determine whether the system has properly installed and operated the optimal corrosion control treatment designated in 43.8(2) "d." Upon reviewing the results of tap water and water quality parameter monitoring by the public water supply system, both before and after the system installs optimal corrosion control treatment, the department shall designate:

1. A minimum value or a range of values for pH measured at each entry point to the distribution system;

2. A minimum pH value, measured in all tap samples. Such value shall be equal to or greater than 7.0 unless meeting a pH level of 7.0 is not technologically feasible or is not necessary for the public water supply system to optimize corrosion control;

3. If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, necessary to form a passivating film on the interior walls of the pipes of the distribution system;

4. If alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples;

5. If calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples.

(2) The values for the applicable water quality control parameters listed above shall be those which reflect optimal corrosion control treatment for the public water supply system. The department may designate values for additional water quality control parameters determined by the department to reflect optimal corrosion control for the system. The department shall notify the system in writing of these determinations and explain the basis for its decisions.

g. Continued operation and monitoring. All public water supply systems shall maintain water quality parameter values at or above minimum values or within ranges designated by the department under 43.8(2)“f” in each sample collected under 567—subparagraph 41.4(1)“d”(4). If the water quality parameter value of any sample is below the minimum value or outside the range designated, then the public water supply system is out of compliance. As specified in 567—subparagraph 41.4(1)“d”(4), the public water supply system may take a confirmation sample for any water quality parameter value no later than three days after the first sample. If a confirmation sample is taken, the result must be averaged with the first sampling result and the average must be used for any compliance determinations under this paragraph.

h. Modification of department treatment decisions. A determination of the optimal corrosion control treatment under 43.8(2)“d” or optimal water quality control parameters under 43.8(2)“f” may be modified. A request for modification by a public water supply system or other interested party shall be in writing, explain why the modification is appropriate, and provide documentation. The department may modify its determination where it concludes that such change is necessary to ensure that the public water supply system continues to optimize corrosion control treatment. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the decision, and provide an implementation schedule for completing the treatment modifications.

43.8(3) Source water treatment requirements. Public water supply systems shall complete the applicable source water monitoring and treatment requirements, as described in the referenced portions of 43.8(3)“b,” and in 567—paragraphs 41.4(1)“c” and “e,” by the following deadlines.

a. Deadlines for completing source water treatment steps.

(1) Step 1. A public water supply system exceeding the lead or copper action level shall complete lead and copper source water monitoring under 567—subparagraph 41.4(1)“e”(2) and make a written treatment recommendation to the department within six months after exceeding the lead or copper action level.

(2) Step 2. The department shall make a determination regarding source water treatment pursuant to 43.8(3)“b”(2) within six months after submission of monitoring results under Step 1.

(3) Step 3. If installation of source water treatment is required, the system shall install the treatment pursuant to 43.8(3)“b”(3) within 24 months after completion of Step 2.

(4) Step 4. The public water supply system shall complete follow-up tap water monitoring under 567—numbered paragraph 41.4(1)“c”(4)“2” and source water monitoring under 567—subparagraph 41.4(1)“e”(3) within 36 months after completion of Step 2.

(5) Step 5. The department shall review the system’s installation and operation of source water treatment and specify maximum permissible source water levels under 43.8(3)“b”(4) within six months after completion of Step 4.

(6) Step 6. The public water supply system shall operate in compliance with the specified maximum permissible lead and copper source water levels under 43.8(3)“b”(4) and continue source water monitoring pursuant to 567—subparagraph 41.4(1)“e”(4).

b. Description of source water treatment requirements.

(1) System treatment recommendation. Any system which exceeds the lead or copper action level shall recommend in writing to the department the installation and operation of one of the source water treatments listed in 43.8(3)“b”(2). A system may recommend that no treatment be installed based upon a demonstration that source water treatment is not necessary to minimize lead and copper levels at users’ taps.

(2) Source water treatment determinations. The department shall complete an evaluation of the results of all source water samples submitted by the public water supply system to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to user taps. If the department determines that treatment is needed, the department will then require installation and operation of the source water treatment recommended by the public water supply system or require the installation and operation of another source water treatment from among the following: ion exchange, reverse osmosis, lime softening or coagulation/filtration. If the department requests additional information to aid in its review, the water system shall provide the information by the date specified in its request. The department shall notify the system in writing of its determination and set forth the basis for its decision.

(3) Installation of source water treatment. Public water supply systems shall properly install and operate the source water treatment designated by the department under 43.8(3) "b"(2).

(4) Department review of source water treatment and specification of maximum permissible source water levels. The department shall review the source water samples taken by the water supply system both before and after the system installs source water treatment, and determine whether the public water supply system has properly installed and operated the designated source water treatment. Based upon its review, the department shall designate maximum permissible lead and copper concentrations for finished water entering the distribution system. Such levels shall reflect the contaminant removal capability of the treatment (properly operated and maintained). The department will notify the public water supply system in writing and explain the basis for its decision.

(5) Continued operation and maintenance. Each public water supply system shall maintain lead and copper levels below the maximum permissible concentrations designated by the department at each sampling point monitored in accordance with 567—paragraph 41.4(1) "e." The system is out of compliance with this paragraph if the level of lead or copper at any sampling point is greater than the maximum permissible designated concentration.

(6) Modification of treatment decisions. The department may modify its determination of the source water treatment under 43.8(3) "b"(6), or maximum permissible lead and copper concentrations for finished water entering the distribution system under 43.8(3) "b"(4). A request for modification by a public water supply system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The department may modify its determination where it concludes that such change is necessary to ensure that the system continues to minimize lead and copper concentrations in source water. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the decision, and provide an implementation schedule for completing the treatment modifications.

43.8(4) Lead service line replacement requirements.

a. Public water supply systems that fail to meet the lead action level in tap samples taken pursuant to 567—numbered paragraph 41.4(1) "c"(4)"2" after installing corrosion control or source water treatment (whichever sampling occurs later) shall replace lead service lines in accordance with the requirements of this subrule. If a system is in violation of 43.8(1) and 43.8(3) for failure to install source water or corrosion control treatment, the department may require the system to commence lead service line replacement under this subrule after the date by which the system was required to conduct monitoring under 567—numbered paragraph 41.4(1) "c"(4)"2" has passed.

b. Lead service line replacement schedule. A public water supply system shall replace annually at least 7 percent of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The system shall identify the initial number of lead service lines in its distribution system based upon a materials evaluation, including the evaluation required under 567—subparagraph 41.4(1) "c"(1). The first year of lead service line replacement shall begin on the date the action level was exceeded in tap sampling referenced in 43.8(4) "a."

c. Exemption. A public water supply system is not required to replace an individual lead service line if the lead concentration in all service line samples from that line, taken pursuant to 567—numbered paragraph 41.4(1) “c”(2)“3,” is less than or equal to 0.015 mg/l.

d. Lead service line control. A public water supply system shall replace the entire service line (up to the building inlet) unless it demonstrates to the satisfaction of the department that it controls less than the entire service line. In such cases, the system shall replace the portion of the line which the department determines is under the system’s control. The system shall notify the user served by the line that the system will replace the portion of the service line under its control and shall offer to replace the building owner’s portion of the line, but is not required to bear the cost of replacing the building owner’s portion of the line. For buildings where only a portion of the lead service line is replaced, the water system shall inform the resident(s) that the system will collect a first flush tap water sample after partial replacement of the service line is completed if the resident(s) so desires. In cases where the resident(s) accepts the offer, the system shall collect the sample and report the results to the resident(s) within 14 days following partial lead service line replacement.

e. Lead service line control—department review. A public water supply system is presumed to control the entire lead service line (up to the building inlet) unless the system demonstrates to the satisfaction of the department in a letter submitted under 567—subparagraph 41.10(7) “e”(4) that it does not have any of the following forms of control over the entire line (as defined by state statutes, municipal ordinances, public service contracts or other applicable legal authority): authority to set standards for construction, repair, or maintenance of the line, authority to replace, repair, or maintain the service line, or ownership of the service line. The department shall review the information supplied by the system and determine whether the system controls less than the entire service line and, in such cases, shall determine the extent of the system’s control. The determination shall be in writing and it must explain the basis underlying the decision.

f. The department shall require a public water supply system to replace lead service lines on a shorter schedule than that required by this subrule, taking into account the number of lead service lines in the system, where such a shorter replacement schedule is feasible. The department shall make this determination in writing and notify the system of its finding within six months after the system is triggered into lead service line replacement based on monitoring referenced in 43.8(4) “a.”

g. Any public water supply system may cease replacing lead service lines whenever first draw samples collected pursuant to 567—numbered paragraph 41.4(1) “c”(2)“2” meet the lead action level during each of two consecutive monitoring periods and the system submits the results. If the first draw tap samples collected in any such water system thereafter exceed the lead action level, the system shall recommence replacing lead service lines, as detailed in 43.8(4) “b.”

h. To demonstrate compliance with 43.8(4) “a” through “d,” a system shall report the information specified in 567—paragraph 41.10(7) “e.”

TABLE A
SEPARATION DISTANCES FROM WELLS
 (Based on 1973/74 response to R17—Ch 43, Table C)

	SOURCE OF CONTAMINATION	DISTANCES (FEET)									
		5	10	25	50	75	100	200	400	1000	
WASTEWATER STRUCTURES	WELL HOUSE FLOOR DRAINS	0									
	POINT DISCHARGE TO GROUND SURFACE	Water treatment plant effluents				0					
		Sanitary & industrial discharges								0	
	WELL HOUSE FLOOR DRAINS TO SURFACE	0	0	0	0	0	0	0	0	0	
	WELL HOUSE FLOOR DRAINS TO SEWERS		0	0	0	0	0	0	0	0	
	Water plant effluents		0	0	0	0	0	0	0	0	
	Sanitary & storm sewers, drains		0	0	0	0	0	0	0	0	
	Sewer force mains					0	0	0	0	0	
	LAND APPLICATION							0	0	0	
	Gravels						0	0	0	0	
	Irrigation of wastewater						0	0	0	0	
	Concrete vaults & sewer stacks					0	0	0	0	0	
	Mechanical wastewater treatment plants							0	0	0	
	Cess-pools & earth pit privies							0	0	0	
	Soil absorption fields							0	0	0	
Leachates								0	0		
CHEM.	Chemical application to ground surface					0	0	0	0	0	
	CHEMICAL TANK					0	0	0	0	0	
	MINERAL STORAGE					0	0	0	0	0	
PHI QUALS	Animal enclosure							0	0	0	
	Animal enclosure							0	0	0	
	SOLID WASTES	Land application of solids					0	0	0	0	
		Land appl. of liquid or slurry					0	0	0	0	
		Storage tank					0	0	0	0	
		Soils stockpile							0	0	
Storage basin or lagoon								0	0		
WATER	Sanitary storage tanks or p.c.						0	0	0	0	
	Reservoirs, cistns, ponds		0	0	0	0	0	0	0	0	
	Flaming devices or open surface water bodies				0	0	0	0	0	0	
	Cisterns				0	0	0	0	0	0	
	Sewer lines							0	0	0	
	Private wells								0	0	
	Solid waste disposal sites									0	

0 = Direct well
 S = Surface well
 G = Gill wells

CLV

PH = P.H. of water in the well
 S = P.H. of water in the well
 CLV = P.H. of water in the well

TABLE B
Minimum Self-Monitoring Requirements
Public Water Supply Systems
[Prior to 12/12/90, appeared in 567—Ch 41, Table D]

CATEGORY	TREATMENT TYPE WATER PUMPAGE ¹	PLANT GRADE	MONITORING PARAMETER	MONITORING FREQUENCY	SAMPLE LOCATION
1.	Iron or manganese removal; aeration; chlorination; fluorida- tion; stabilization; any other chemical addition; or any com- bination of these processes. 0.025 to less than 0.1 MGD	I	Flow Residual Chlorine Fluoride Fluoride Iron Manganese pH Phosphate (PO ₄)	daily daily daily 1/month 1/week 1/week 1/week 1/week	Raw, Final Final, Distr. System Final Raw Raw, Final Raw, Final Final Final
1.	Iron or manganese removal; aeration; chlorination; fluorida- tion; stabilization; any other chemical addition; or any com- bination of these processes. 0.1 to 1.5 MGD	II	Flow Residual Chlorine Fluoride Fluoride Iron Manganese pH Phosphate (PO ₄)	daily daily daily 1/month 2/week 2/week 2/week 2/week	Raw, Final Final, Distr. System Final Raw Raw, Final Raw, Final Final Final
1.	Iron or manganese removal; aeration; chlorination; fluorida- tion; stabilization; any other chemical addition; or any com- bination of these processes. greater than 1.5 MGD	III	Flow Residual Chlorine Fluoride Fluoride Iron Manganese pH Phosphate (PO ₄)	daily daily daily 2/month daily daily daily daily	Raw, Final Final, Distr. System Final Raw Raw, Final Raw, Final Final Final
1. Where the pumpage is unknown, the plant grade will be determined from the population and an evaluation of industrial users.					
2.	Ion exchange softening. 0.025 to 0.5 MGD	II	pH Hardness Alkalinity Flow Sodium	2/week 2/week 1/week daily annual	Final Raw, Final Raw, Final Raw, Bypass, Final or Treated
2.	Ion exchange softening. Greater than 0.5 MGD	III	pH Hardness Alkalinity Flow Sodium	daily daily daily daily annual	Final Raw, Final Raw, Final Raw, Bypass or Treated, Final
3.	Direct surface water filtration. 0.025 to 0.5 MGD	II	Turbidity pH Flow Temperature Alkalinity	daily 2/week daily daily daily daily	Final Raw Raw, Final Raw, Final Raw Raw, Final

TABLE B (Continued)
Minimum Self-Monitoring Requirements
Public Water Supply Systems

CATEGORY	TREATMENT TYPE WATER PUMPAGE ¹	PLANT GRADE	MONITORING PARAMETER	MONITORING FREQUENCY	SAMPLE LOCATION
3.	Direct surface water filtration. Greater than 0.5 MGD	III	Turbidity	daily	Raw, Final
			pH	daily	Raw, Final
			Flow	daily	Raw, Final
			Temperature	daily	Raw
			Alkalinity	daily	Raw, Final
4.	Utilization of lime, soda ash or other chemical additions for pH adjustment in the precipitation and coagulation of iron or man- ganese. 0.025 to 0.5 MGD	II	Flow	daily	Raw, Final
			Iron	1/week	Raw, Final
			Manganese	1/week	Raw, Final
			pH	daily	Final
			pH	1/week	Raw
4.	Utilization of lime, soda ash or other chemical additions for pH adjustment in the precipitation and coagulation of iron or man- ganese. Greater than 0.5 MGD	III	Alkalinity	1/week	Final
			Flow	daily	Raw, Final
			Iron	1/week	Raw
			Iron	daily	Final
			Manganese	1/week	Raw
5.	Complete surface water clarifi- cation or lime softening of sur- face water. 0.0 to less than 0.1 MGD	III	Manganese	daily	Final
			pH	1/week	Raw
			pH	daily	Final
			Alkalinity		
5.	Complete surface water clarifi- cation or lime softening of sur- face water. 0.1 to 1.5 MGD	III	Flow	daily	Raw, Final
			Turbidity	daily	Raw, Final
			pH	daily	Raw, Final
			Color	daily	Final
			Odor	daily	Final
5.	Complete surface water clarifi- cation or lime softening of sur- face water. Greater than 1.5 MGD	IV	Temperature	daily	Raw
			Alkalinity (P&M)	daily	Raw, Final
			Hardness	daily	Raw, Final
5.	Lime softening of groundwater. 0.0 to 1.5 MGD	III	Flow	daily	Raw, Final
			pH	1/week	Raw
			pH	daily	Final
			Temperature	1/week	Raw
			Alkalinity	1/week	Raw
	Greater than 1.5	IV	Alkalinity	daily	Final
			Hardness	1/week	Raw
			Hardness	daily	Final
			Fluoride ²	daily	Raw, Final

2. Sampling required if fluoride reduction is being utilized to comply with the MCL.

TABLE B (Continued)
Minimum Self-Monitoring Requirements
Public Water Supply Systems

CATEGORY	TREATMENT TYPE WATER PUMPAGE ¹	PLANT GRADE	MONITORING PARAMETER	MONITORING FREQUENCY	SAMPLE LOCATION
6.	Reverse osmosis and electro-dialysis. 0.025 to less than 0.5 MGD 0.5 to 1.5 MGD Greater than 1.5 MGD	II III IV	Flow	daily	Raw, Reject, Final
			TDS (filterable residue)	daily	Raw, Final
			pH	1/week	Raw
			pH	daily	Final
			Alkalinity (P&M)	daily	Final
			Hardness (T)	1/week	Raw
			Hardness (T)	daily	Final
7.	Demineralization or NO ₃ reduction by ion exchange. 0.025 to less than 0.5 MGD 0.5 to 1.5 MGD Greater than 1.5 MGD	II III IV	Designated by department	X	X
			Flow	daily	Raw, Bypass, Final
			NO ₃	daily	Raw, Final
			SO ₄	1/week	Raw, Final
			pH	1/week	Raw, Final
			Designated by department	X	X
8.	Activated carbon for THM or synthetic organics removal. 0.025 to 1.5 MGD Greater than 1.5 MGD	III IV	Total organic carbon as designated by department	1/3 mo.	Raw, Final
				X	X

These rules are intended to implement Iowa Code chapter 455B, division III, part 1.
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